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| 10/019,954 | 05/24/2002 | Eric Samain | 065691-0267 | 6242 |

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| EXAMINER | |
|---|---|
| PROUTY, REBECCA E | |

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/019,954 | SAMAIN ET AL. | |
| | Examiner | Art Unit | |
| | Rebecca E. Prouty | 1652 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *28 February 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1,2,5-13,15-24 and 26-48* is/are pending in the application.

4a) Of the above claim(s) *15-17,21-24,29,31-38 and 40-46* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 2, 5-13, 18-20, 26-28, 30, 39, 47, and 48* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/28/07 has been entered.

Claims 3, 4, 14, and 25 have been canceled. Claims 1, 2, 5-13, 15-24, 26-46 and newly presented claims 47-48 are still at issue and are present for examination.

Claims 15-17, 21-24, 29, 31-38, and 40-46 remain withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention or species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 1/13/05.

Applicants' arguments filed on 2/28/07, have been fully considered and are deemed to be persuasive to overcome some of the rejections previously applied. Rejections and/or objections not reiterated from previous office actions are hereby withdrawn.

Claims 47 and 48 are objected to because of the following informalities: the word "the" should be inserted prior to

"enzyme" in the phrase "wherein enzyme is a glycosyltransferase". Appropriate correction is required.

Claims 1, 2, 5-13, 18-20, 26-28, 30, 39, 47, and 48 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 48 (upon which claims 2, 5-13, 18-20, 26-28, 30, and 39 depend) is confusing in the recitation of "producing an oligosaccharide comprising lactose … starting with at least one internalized exogenous precursor selected from the group consisting of lactose, sialic acid, α-galactoside, and β-galactoside" as it is unclear how sialic acid, α-galactosides or β-galactosides other than lactose are precursors for an oligosaccharide comprising lactose.

Claims 1, 2, 47, and 48 (upon which claims 5-13, 18-20, 26-28, 30, and 39 depend) are indefinite in the recitation "lacks any enzymatic activity liable to degrade said oligosaccharide, said precursor, and said intermediates" or "lacks any enzymatic activity liable to degrade said endogenous precursor" as it is unclear what the meaning of "liable to degrade" is and it is unclear what enzymes must be absent as it is impossible to determine all enzymes which might degrade any oligosaccharide,

any endogenous precursor or any intermediate in the pathway to synthesize an oligosaccharide. As metabolism of saccharides is the primary energy source for the growth of *E. coli*, there are many enzymes necessary for growth which are capable of degrading saccharides such as glucose and galactose (as well as other monosaccharides) which would be intermediates and/or endogenous precursors in the pathway to synthesize many oligosaccharides.

Claim 47 is confusing in the recitation of "oligosaccharide selected from the group consisting of lactose, sialic acid, α-galactoside, and β-galactoside" as these are the exogenous precursor not the oligosaccharide to be synthesized.

Claims 47 and 48 lack antecedent basis for "said intermediates"

Claims 20, 47 and 48 are confusing in the recitation of "exposing said cell to lactose permease under conditions sufficient to induce internalization of said exogenous precursor" and "wherein transport of said precursor is preformed by lactose permease" as it is unclear under what conditions lactose permease will internalize sialic acid.

Claims 1, 2, 5-13, 18-20, 26-28, 30, 39, 47, and 48 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the

specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 1, 2, 5-13, 18-20, 26-28, 30, 39, 47, and 48 are directed to methods of making any oligosaccharide comprising lactose intracellularly within *E. coli* using a genus of enzymes for synthesis of said oligosaccharide from an exogenous precursor selected from lactose, sialic acid, α-galactoside, and β-galactoside wherein the *E. coli* cell lacks any enzymatic activity capable of degrading the oligosaccharide, all precursors of said oligosaccharide and all intermediates in the biosynthetic pathway of said oligosaccharide from said exogenous precursor by culturing the cell under conditions inducing active internalization of said exogenous precursor. The specification teaches the production of only a few representative species of such methods which all use particular bacterial glycosyltransferase genes and Lac $Z^{-}Y^{+}$ *E. coli*. The claims recite methods of producing an enormous number of oligosaccharides from any exogenous precursor selected from lactose, sialic acid, α-galactoside, and β-galactoside. While the art clearly teaches a few species of enzymes which can be used in the claimed methods, it is well known in the art that

glycosyltransferases are highly specific to the type of saccharide linkage they produce. Furthermore, the vast majority of known glycosyltransferase genes are eukaryotic in origin and seldom can be expressed easily in *E. coli*. The art does not provide representative species of all genes which encode all possible enzymes within the scope of applicants claimed methods. Furthermore, there are an enormous number of potential precursors for oligosaccharides only some of which are endogenously present in *E. coli* or can be transported across the plasma membrane of *E. coli*. While the specification teaches a few oligosaccharides which can be synthesized using lactose as an exogenously supplied precursor and a means to transport sufficient lactose into *E. coli*, many oligosaccharides would also require other exogenous precursors for which suitable transport systems may not be known. The specification clearly does not teach sufficient representative species to allow a skilled artisan to produce any oligosaccharide comprising lactose as the specification fails to teach enzymes and transporters necessary for utilization of many precursors of such oligosaccharides. Finally, the claimed methods recite the use of any *E. coli* modified in a variety of ways to prevent the degradation of the oligosaccharide of interest, any precursor of said oligosaccharide including any endogenous or exogenous

precursor or any intermediate in the pathway to synthesize said oligosaccharide. The specification clearly does not teach sufficient representative species of such bacteria as metabolism of saccharides is the primary energy source for the growth of *E. coli*, such that there are many enzymes which are capable of degrading saccharides particularly for degrading monosaccharides such as glucose and galactose (as well as other monosaccharides) which would be intermediates and/or endogenous precursors in the pathway to synthesize many oligosaccharides. As such, the teaching of an *E. coli* capable of producing a particular oligosaccharide of interest cannot be considered to be representative of the types of modifications which would be necessary for the production of all oligosaccharides. Given this lack of description of representative species of enzymes and modified *E. coli* utilized in the claimed methods, the specification fails to sufficiently describe the claimed invention in such full, clear, concise, and exact terms that a skilled artisan would recognize that applicants were in possession of the claimed invention.

Applicants argue that rejection focuses on "the fact that the claims still recite the production of an enormous number of varied oligosaccharides each of which require distinctly different sets of genes and requires detailed knowledge of the

biosynthetic pathways" however, compliance with the written description requirement is based on what is claimed. The claims recite a method involving the use of a genetically modified cell that can internalize precursor to form oligosaccharide. This argument is not understood as the rejection does focus on what is claimed. While the claims do not recite the genes of the modified *E. coli* cell directly, these products are necessary for performing the recited methods. The claims do not recite a single method but a enormously diverse genus of different methods each of which require different genes, different precursors and different modifications of the *E. coli* cell to prevent degradation of the precursors, intermediates and products and produce different end products. The small number of working examples in the specification are clearly not representative of the diversity of methods encompassed by applicants claims.

Claims 1-13, 18-20, 25-28, 30, 39, 47, and 48 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for methods of making lacto-N-neotetraose or polylactosamine from lactose using Lac $Z^{-}Y^{+}$ *E. coli* transformed with the *Neisseria gonorrhoeae* LgtA and LgtB genes, does not reasonably provide enablement for methods of making any oligosaccharide comprising lactose from lactose, sialic acid,

any α-galactoside, or any β-galactoside in any *E. coli*. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims.

Claims 1, 2, 5-13, 18-20, 26-28, 30, 39, 47, and 48 are directed to methods of making any oligosaccharide comprising lactose intracellularly within *E. coli* using a genus of enzymes for synthesis of said oligosaccharide from an exogenous precursor selected from lactose, sialic acid, α-galactoside, and β-galactoside wherein the *E. coli* cell lacks any enzymatic activity capable of degrading the oligosaccharide, all precursors of said oligosaccharide and all intermediates in the biosynthetic pathway of said oligosaccharide from said exogenous precursor by culturing the cell under conditions inducing active internalization of said exogenous precursor.

The scope of the claims is not commensurate with the enablement provided by the disclosure with regard to the extremely large number of methods broadly encompassed by the claims. It is well known in the art that oligosaccharides are a highly diverse group of compounds that encompass an enormous diversity of monosaccharide units which can be linked to one another in a vast array of distinct types of linkages. It is

further known in the art that each distinct linkage is generally catalyzed by a distinct enzyme (i.e., glycosyltransferase) and that glycosyltransferases that catalyze different linkages generally have little of no structural homology to each other. The claims recite methods of making any oligosaccharide comprising lactose in *E. coli*, requiring the use of an enormous number of different glycosyltransferase genes. The specification teaches only a few such genes which clearly do not provide a skilled artisan the ability to catalyze the synthesis of any possible oligosaccharide linkage desired. Furthermore, the vast majority of known glycosyltransferase genes are eukaryotic in origin and seldom can be expressed easily in *E. coli*, even further limiting the scope of available glycosyltransferase genes which could be used in the claimed methods. Furthermore, there are an enormous number of potential precursors for oligosaccharides only some of which are endogenously present in *E. coli* or can be transported across the plasma membrane of *E. coli*. While the specification teaches a few oligosaccharides which can be synthesized using lactose as an exogenously supplied precursor and a means to transport sufficient lactose into *E. coli*, many oligosaccharides would also require other exogenous precursors for which suitable transport systems may not be known. Finally, the claimed

methods recite the use of any *E. coli* modified in a variety of ways to prevent the degradation of oligosaccharide of interest, any precursor of said oligosaccharide including any endogenous or exogenous precursor or any intermediate in the pathway to synthesize said oligosaccharide. The specification clearly does not teach sufficient guidance for the use of any such *E. coli.* as metabolism of saccharides is the primary energy source for the growth of *E. coli*, such that there are many enzymes which are capable of degrading saccharides particularly for degrading monosaccharides such as glucose and galactose (as well as other monosaccharides) which would be intermediates and/or endogenous precursors in the pathway to synthesize many oligosaccharides. As such, the teaching of an *E. coli* capable of producing a particular oligosaccharide of interest cannot be considered to be guidance for the entire scope of modifications which would be necessary for the production of any oligosaccharide comprising lactose.

Thus, applicants have <u>not</u> provided sufficient guidance to enable one of ordinary skill in the art to make and use the claimed invention in a manner reasonably correlated with the scope of the claims broadly including methods of making any oligosaccharide comprising lactose from lactose, sialic acid, any α-galactoside, or any β-galactoside in any *E. coli*. The

scope of the claims must bear a reasonable correlation with the scope of enablement (In re Fisher, 166 USPQ 19 24 (CCPA 1970)). Without sufficient guidance, determination of methods of making oligosaccharides as claimed is unpredictable and the experimentation left to those skilled in the art is unnecessarily, and improperly, extensive and undue. See In re Wands 858 F.2d 731, 8 USPQ2nd 1400 (Fed. Cir, 1988).

Applicants argue that the specification provides sufficient guidance to allow a skilled artisan to practice the presently claimed invention without undue experimentation specifically arguing that *In re Cook*, 439 F.2d 730 (CCPA 1971) in which the court reversed and enablement rejection is particularly instructive in the present case. However this is not persuasive as in *In re Cook* the court found that although the applicant had not taught those skilled in the art how to design an entire new zoom lens in short order, it has taught those skilled in the art how to design a new zoom lens of the type claimed in that case. However, that is not the case in the instant rejection. The instant rejection has explained in detail why the specification is not sufficient to enable the full scope of methods currently claimed. Nowhere has the rejection required applicants to enable that which is outside of what is claimed. Applicants claims recite a enormously diverse genus of different methods

each of which require different genes, different precursors and different modifications of the *E. coli* cell to prevent degradation of the precursors, intermediates and products and produce different end products. The small number of working examples in the specification are clearly not sufficient guidance for the skilled artisan to practice the diversity of methods encompassed by applicants claims.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 2, 5-13, 18-20, 26-28, 39, 47, and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bettler et al. in view of Kozumi et al.

Bettler et al. teach the intracellular production of the oligosaccharide βGal(1,4)[βGlcNAc(1,4)]$_4$GlcNAc using a LacZ$^-$ *E. coli* transformed with the *Azorhizobium* NodC gene encoding chitin pentaose synthase and the *Neisseria gonorrhoeae* LgtB gene encoding an β-1,4-galactosyltransferase from exogenously provided glycerol using high cell density culture techniques as recited in claims 10-13 and that these culture techniques lead to high production levels of the desired oligosaccharide. Bettler et al. do not specifically teach the use of lactose as precursor for the production of a desired oligosaccharide, the use of lactose permease for the transport of exogenous lactose into the cell, use of an inducer such as IPTG for increasing the expression of the glycosyltransferase and/or the expression of the lactose permease gene, or the production of a radioactively labeled oligosaccharide.

Kozumi et al. teach the production of the trisaccharide globotriose from lactose using a permeabilized LacZ$^-$ *E. coli* transformed with the *Neisseria gonorrhoeae* LgtC gene encoding an α-1,4-galactosyltransferase (see page 848-849). However the lactose precursor of Kozumi et al. is not internalized into the cell as the cells of Kozumi have been detergent treated to destroy the cell membrane.

Bettler et al. clearly teach the advantages of production of a desired oligosaccharide intracellularly in a growing *E. coli* culture including that overproduction and purification of the glycosyltransferases is not needed, that the metabolic pathways for synthesis of most sugar-nucleotide donors are already present, the culture medium is inexpensive and fermenter technology is well established. Therefore, it would have been obvious to use the transformed LacZ$^-$ *E. coli* of Kozumi et al. without permeabilizing the membrane as taught by Bettler et al. While this would clearly require the lactose precursor to be internalized, the *E. coli* Lac Y gene is well known in the art to encode the lactose permease necessary for active transport of lactose across the plasma membrane of *E. coli*. A skilled artisan would have been motivated to express this gene in the bacteria of Kozumi et al. as lactose is the precursor used by Kozumi et al. and the presence of an active lactose permease would provide higher intracellular levels of the precursor. A skilled artisan would reasonably expect that increasing the intracellular levels of the precursor would increase the amount of globotriose produced. Furthermore, while Kozumi et al. do not specifically teach the use of an inducer such as IPTG for controlling the expression of the glycosyltransferase and/or the expression of the lactose permease gene, the lactose promoter of

*E. coli* is well known in the art to be induced by IPTG. As the expression of heterologous genes constitutively in cells is well known to increase the metabolic burden on the cells it would have been obvious to one of skill in the art to place the glycosyltransferase and lactose permease gene under control of an inducible promoter such as the lactose promoter and to induce their expression only after sufficient cell density is achieved.

Bettler et al. and Kozumi et al. further do not specifically teach the production of radioactively labeled oligosaccharides. However, as the use of radioactively labeled oligosaccharides is well known in the art it would have been obvious to produce radioactively labeled globotriose by including radioactively labeled lactose or galactose (i.e., the precursors of the globotriose) in the reaction.

Applicants previously argued that one of skill in the art would have no motivation to combine Bettler and Kozumi, much less any expectation of success as it was known in the art that rapid uptake of sugars by lactose permease disrupts membrane function, possibly by causing collapse of the membrane potential and results in growth inhibition and eventually cell death. Applicants argue that according to the claimed method, the cells can be grown on glucose or glycerol, and since their lactose permease is induced by IPTG, they should be killed by lactose.

However, this is not persuasive because there is no requirement in the claims that the level of lactose permease induction is sufficiently high to cause cell death. The disclosure of Dykhuizen et al. makes it clear that there is a strong correlation between the amount of lactose permease and the amount of lactose killing (see pg 878). As such a skilled artisan would merely have found it obvious to simply allow the cells to grow in the absence of inducer until a desired cell density is achieved and then add the inducer only during the oligosaccharide synthesis step and to keep the amount of inducer low such that lactose killing would be avoided. Applicants argue that this statement is unsupported, however, the use of inducible expression following an initial cell growth phase is a well known solution to the production of proteins known to be toxic to the cell. Furthermore, it should be noted that the majority of applicants claims are not limited to methods in which lactose permease is the transporter of the exogenous precursor but applicants above arguments are relevant only to this situation. The rejection presented art that was considered most relevant to applicants elected species of exogenous precursor (i.e., lactose) and thus suggested lactose permease as the transporter. However, the full scope of applicants claims

has not been searched as the search was initially limited to the elected species for which suitable art was found.

Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bettler et al. in view of Kozumi et al. as applied to claims 1, 2, 5-13, 18-20, 26-28, 39, 47, and 48 above, and further in view of Johnson and Gotschlich (WO 96/10086).

Bettler et al. and Kozumi et al. are described above but does not teach the production of lacto-N-neotetraose from lactose using a bacterium transformed with a β-1,3-N-acetyl-glucosaminyltransferase and a β-1,4-galactosyltransferase gene. However, Bettler et al. clearly suggest the production of other oligosaccharides using as similar strategy to that used for βGal(1,4)[βGlcNAc(1,4)]$_4$GlcNAc production in *E. coli* transformed with other bacterial glycosyltransferase genes (see page 211).

Johnson et al. teach the production of lacto-N-neotetraose from lactose using bacterially expressed β-1,3-N-acetyl-glucosaminyltransferase and β-1,4-galactosyltransferase from *Neisseria gonorrhoeae* (see page 65).

Gotschlich teach the *Neisseria gonorrhoeae* LgtA and LgtB genes which encode the β-1,3-N-acetyl-glucosaminyltransferase and β-1,4-galactosyltransferase necessary for the synthesis of the

lacto-N-neotetraose structures found on the lipooligosaccharides of the bacteria and the use of these proteins for the synthesis of lacto-N-neotetraose.

Therefore, it would have been obvious to produce lacto-N-neotetraose intracellularly in a LacZ⁻ *E. coli* transformed with the *Neisseria gonorrhoeae* LgtA and LgtB genes as Bettler et al. et al. clearly teach the usefulness of this system for the production of a variety of oligosaccharides, both Johnson and Gotschlich teach that lacto-N-neotetraose is a oligosaccharide of interest, Johnson show that this oligosaccharide can be produced using the β-1,3-N-acetyl-glucosaminyltransferase and β-1,4-galactosyltransferase from *Neisseria gonorrhoeae* and lactose as a precursor and Gotschlich teach the genes necessary for producing the transformed strain. While this would clearly require the lactose precursor to be internalized, the *E. coli* Lac Y gene is well known in the art to encode the lactose permease necessary for active transport of lactose across the plasma membrane of *E. coli*. A skilled artisan would have been motivated to express this gene in the bacteria as lactose is the precursor suggested by Johnson and the presence of an active lactose permease would provide higher intracellular levels of the precursor. A skilled artisan would reasonably expect that increasing the intracellular levels of the precursor would

increase the amount of lacto-N-neotetraose produced. As the expression of heterologous genes constitutively in cells is well known to increase the metabolic burden on the cells it would have been obvious to one of skill in the art to place the glycosyltransferase and lactose permease gene under control of an inducible promoter such as the lactose promoter and to induce their expression only after sufficient cell density is achieved.

Applicant has not presented any arguments specifically traversing this rejection but instead relies upon the traversal discussed above. Therefore, this rejection is maintained for the reasons presented above.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rebecca E. Prouty whose telephone number is 571-272-0937. The examiner can normally be reached on Tuesday-Friday from 8 AM to 5 PM. The examiner can also be reached on alternate Mondays

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ponnathapura Achutamurthy, can be reached at (571) 272-0928. The fax phone number for this Group is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Rebecca Prouty

REBECCA E. PROUTY
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